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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/685,370

10/13/2003

Dennis N. Bingham

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7590 03/12/2007  
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EXAMINER

WONG, EDNA

ART UNIT

PAPER NUMBER

1753

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

03/12/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

# Office Action Summary

Application No.

10/685,370

Applicant(s)

BINGHAM ET AL.

Examiner

Edna Wong

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 08 February 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 1-10 and 17-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>October 13, 2003</u> . | 6) <input type="checkbox"/> Other: _____  |

***Election/Restrictions***

Applicant's election without traverse of Group II, claims **11-16**, in the reply filed on February 8, 2007 is acknowledged.

The requirement is still deemed proper and is therefore made FINAL.

Newly submitted claim directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

Accordingly, claims **1-10 and 17-19** are withdrawn from consideration as being directed to a non-elected invention.

***Claim Rejections - 35 USC § 112***

Claim **13** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 13

line 6, it appears that the "fluid" is the same as the fluid recited in claim 11, line 3. However, it is unclear if it is. If it is, then it is suggested that the word -- the -- be inserted after the word "with".

***Claim Rejections - 35 USC § 102/103***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims **11 and 16** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over **Jeffers et al.**

("Disproportionation of Dimethoxyborane", *Inorg. Chem.* (1982), Vol. 21, pp. 2516-2517).

Jeffers teaches a method of forming a borohydride, comprising:

- (a) providing a source of borate ( $= \text{B}(\text{OCH}_3)_3$ );
- (b) mixing the source of borate with a fluid ( $= \text{B}_2\text{H}_6$ ) to form a solution ( $=$  it takes place in the liquid phase);
- (c) exposing the solution of borate and the fluid to an amount of ionizing radiation ( $=$  a low-power microwave discharge) to facilitate the formation of borohydride ( $= \text{HB}(\text{OCH}_3)_2$ ); and
- (d) precipitating and/or concentrating the borohydride from the solution of fluid and borate previously exposed to the ionizing radiation ( $=$  the volatile products were condensed in a liquid-nitrogen trap) [page 2516, left column].

The resulting borohydride has at least about 3 weight percent of hydrogen

(*inherent*).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

I. Claims **12 and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jeffers et al.** ("Disproportionation of Dimethoxyborane", *Inorg. Chem.* (1982), Vol. 21, pp. 2516-2517) as applied to claims 11 and 16 above, and further in view of **Amendola et al.** (US Patent No. 6,433,129 B1).

Jeffers is as applied above and incorporated herein.

The method of Jeffers differs from the instant invention because Jeffers does not disclose the following:

a. Wherein before the step of exposing the solution of borate and the fluid to the ionizing radiation, the method further comprises: providing a catalyst which encourages the borate to form the borohydride, as recited in claim 12.

Like Jeffers, Amendola teaches forming borohydrides. Amendola teaches using a catalyst to promote the reactions (col. 6, lines 30-34; col. 7, lines 50-55; and col. 8, lines 24-29).

It would have been obvious to one having ordinary skill in the art at the time the

invention was made to have modified the method described by Jeffers with wherein before the step of exposing the solution of borate and the fluid to the ionizing radiation, the method further comprises: providing a catalyst which encourages the borate to form the borohydride because a catalyst would have promoted the reaction as taught by Amendola (col. 6, lines 30-34; col. 7, lines 50-55; and col. 8, lines 24-29).

Furthermore, it has been held that the selection of a known material based on its suitability for its intended use supports a prima facie obviousness determination (MPEP § 2144.06 and § 2144.07).

b. . . . Wherein after the step of mixing the source of borate with the fluid to form a solution, and before the step of exposing the solution of the borate and the fluid to an amount of ionizing radiation, the method further comprises: increasing the temperature of the solution of the borate and the fluid to greater than about 10°C; and increasing the pressure to greater than 1 ATM on the solution of borate and fluid to maintain the solution in a liquid phase, as recited in claim 15.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method described by Jeffers by increasing the temperature of the solution of the borate and the fluid to greater than about 10°C because this would have initiated the reaction without having to heat up the entire reactor.

It would have been obvious to one having ordinary skill in the art at the time the

invention was made to have modified the method described by Jeffers by increasing the pressure to greater than 1 ATM on the solution of borate and fluid to maintain the solution in a liquid phase because Jeffers teaches that the reaction can be done in the gas phase or the liquid phase (page 2516, left column). The trimethoxyborane would have to have been kept in the liquid form (condensed) and kept from vaporizing to have been carried out in the liquid phase. And in phase transitions, this would have been due to the temperature and pressure change.

II. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Jeffers et al.** ("Disproportionation of Dimethoxyborane", *Inorg. Chem.* (1982), Vol. 21, pp. 2516-2517) as applied to claims 11 and 16 above, and further in view of **Hale et al.** (US Patent No. 4,931,154).

Jeffers is as applied above and incorporated herein.

The method of Jeffers differs from the instant invention because Jeffers does not disclose wherein after the step of exposing the solution of borate and the fluid to the ionizing radiation, and before the step of precipitating and/or concentrating the borohydride from the solution of the fluid and borate previously exposed to the ionizing radiation, the method further comprises: applying a voltage to the solution of the borate and the fluid, and wherein the borate when combined with fluid forms individual ions which move apart in the solution of borate and the fluid when the voltage is applied to facilitate the formation of the borohydride, as recited in claim 13.

Like Jeffers, Hale teaches forming borohydrides. Hale teaches applying a voltage (= during electrolysis) to the solution of the borate (col. 3, lines 16-28) and the fluid (col. 4, line 61 to col. 5, line 17), and wherein the borate when combined with fluid forms individual ions which move apart in the solution of borate and the fluid when the voltage is applied to facilitate the formation of the borohydride (col. 7, lines 10-26).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method described by Jeffers by applying a voltage to the solution of the borate and the fluid, and wherein the borate when combined with fluid forms individual ions which move apart in the solution of borate and the fluid when the voltage is applied to facilitate the formation of the borohydride because it was known to have produced borohydrates in the cathode compartment of an electrolytic cell having a cation-selective membrane separating anode and cathode compartments as taught by Hale (col. 1, lines 12-27; col. 3, lines 16-28; col. 4, line 61 to col. 5, line 17 and col. 7, lines 10-26).

III. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Jeffers et al.** ("Disproportionation of Dimethoxyborane", *Inorg. Chem.* (1982), Vol. 21, pp. 2516-2517) as applied to claims 11 and 16 above.

Jeffers is as applied above and incorporated herein.

The method of Jeffers differs from the instant invention because Jeffers does not disclose wherein the amount of ionizing radiation which facilitates the formation of



borohydride from the solution of borate and the fluid is greater than about a microcurie per liter of the solution of borate and the fluid, as recited in claim 14.

Jeffers teaches that in all cases, the microwave power was about 10-20 W/head [page 2517].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the amount of ionizing radiation described by Jeffers with wherein the amount of ionizing radiation which facilitates the formation of borohydride from the solution of borate and the fluid is greater than about a microcurie per liter of the solution of borate and the fluid because the amount of ionizing radiation is a result-effective variable and one skilled in the art has the skill to calculate the amount of ionizing radiation that would have determined the success of the desired reaction to occur (MPEP § 2141.03 and § 2144.05(II)(B)).

Furthermore, changes in the amount of ionizing radiation are not deemed a patentable modification. However, such changes may impart patentability to a process if the ranges claimed produce new and unexpected results which are different in kind and not merely in degree from results of the prior art, such ranges are termed "critical" ranges and Applicant has the burden of proving such criticality; even though Applicant's modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within capabilities of one skilled in the art; more particularly, where general conditions of the claim are disclosed in the prior art, it is not inventive to discover optimum or workable ranges by routine experimentation (MPEP §

2144.05).

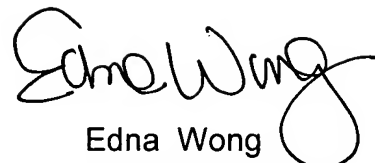
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edna Wong whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Edna Wong  
Primary Examiner  
Art Unit 1753

EW  
March 7, 2007